

Even good smartphones have some room for improvement with streaming video playback

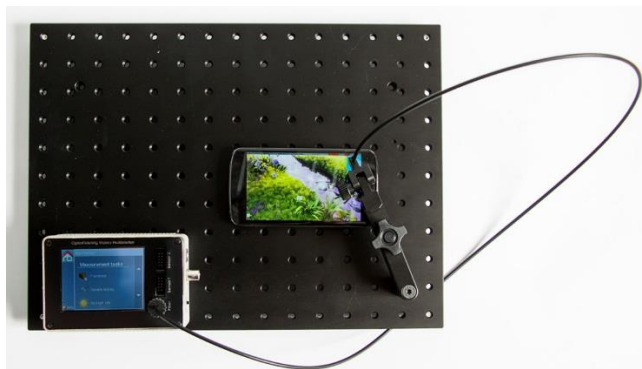
The OptoFidelity test team loves to measure and compare mobile devices to concretize how certain performance features effect the end-user experience. This time we measured the video playback performance of six popular smartphones. The new brand Oneplus One was also included. The other phones tested were the iPhone 5S and 5C, the LG G3, the Samsung Galaxy S4 and S5. Unfortunately we did not have an iPhone 6 available, but the testing sequel is forthcoming.

In this test all devices performed well with locally stored video. The smoothest performance came from the iPhone 5S, but even this flagship model had problems and noticeable deviation with YouTube video performance. As a newcomer, Oneplus One performed well with local videos. There was evident deviation with the playback but the results in general were equal to those of most of the other brands.

1. Video Playback Performance

Video playback performance has become one of the most important features of cellphones. The proportion of online video views of from cellphones and tablets has increased significantly (Business Insider Intelligence 2014) and video playback quality is an important measure in today's mobile multimedia devices. The devices are used for watching videos from various sources, such as Netflix or YouTube, and consumers are very sensitive when it comes to video quality, not accepting indicators of poor performance such as skipped frames, pausing or jerking.

In this case study video playback performance was measured using the OptoFidelity *VideoMultimeter* measurement device. *OptoFidelity VideoMultimeter* is a professional measurement solution for measuring the true and objective video playback performance of cellphones, tablets or any other multimedia device.



In this test we measured the playback of a HD video (24 fps) from YouTube and the playback of a local H.264 video stored on the device with the following image qualities and speeds:

- Video resolution 720 p, speed 30 fps
- Video resolution 1080 p, speed 30 fps
- Video resolution 720 p, speed 60 fps
- Video resolution 1080 p, speed 60 fps

The test videos were generated with OptoFidelity Test Video Generator.

Three qualities were measured in the test. First of all we measured frame interval deviation, which presents to the user as jerking, the target value for deviation is 0 msec. The other value measured was the average speed over the whole video clip: AVG fps. The desired value varied depending on the reported speed of video (24, 30 and 60 fps). The third quality measured was the percentage of dropped frames over whole clip. The higher the dropped frame value, the more jerking the user can see in the video.

3.1 Video Playback Performance Results

The video playback performance of both iPhones was very good, and the performance of the 5c was as good as that of the 5s. The playback was very smooth and both versions played the local video very well, almost without any deviation. On playback of the YouTube video there was a little deviation on both models, but the amount of deviation was less than ± 10 msec. The 5c could not play the local 60fps HD video at all, but this was a more of a feature of the phone, not a failure in the test.

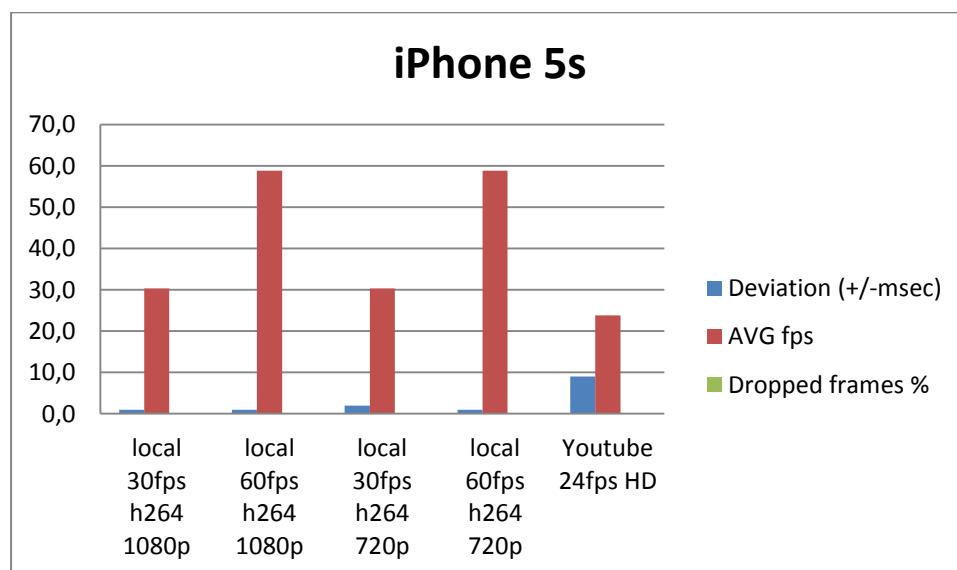


Image 7: iPhone 5s Video playback performance

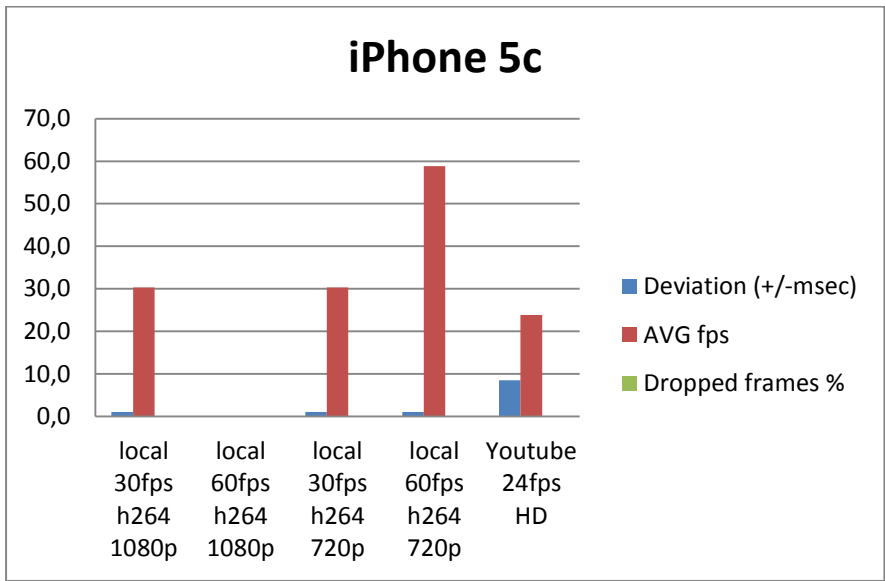


Image 8: iPhone 5c Video playback performance

The video playback performance of Samsung Galaxy S4 was mediocre. When compared to the price of the phone, the performance is not acceptable. With YouTube playback there was a significant deviation (more than ± 10 msec) and the amount of dropped frames would be visible to a consumer. The Samsung S4 could not play the local 60fps HD video at all.

The new Samsung S5 had a vastly improved playback performance compared to the S4. The playing of the local 60fps video was good, with the deviation having dropped in all test cases, and for YouTube playback there were also improvements regarding the dropped frames.

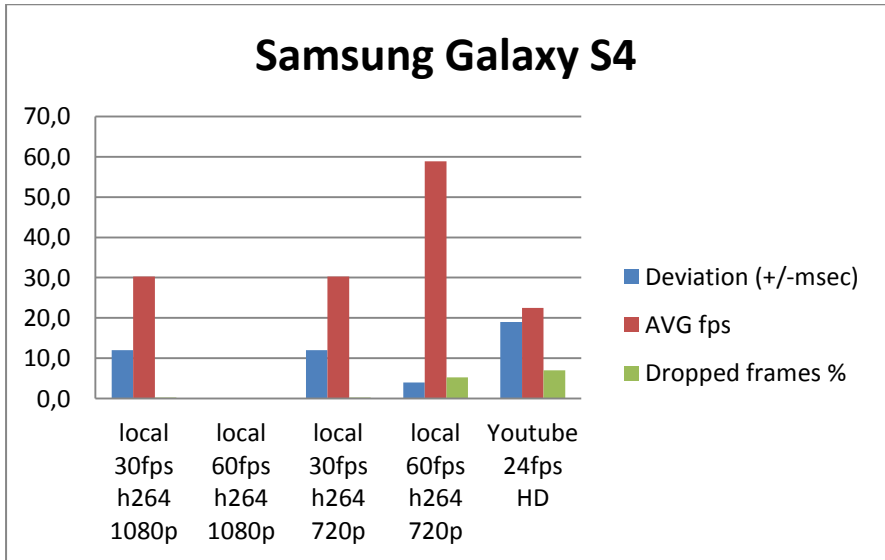


Image 9: Samsung S4 Video playback performance

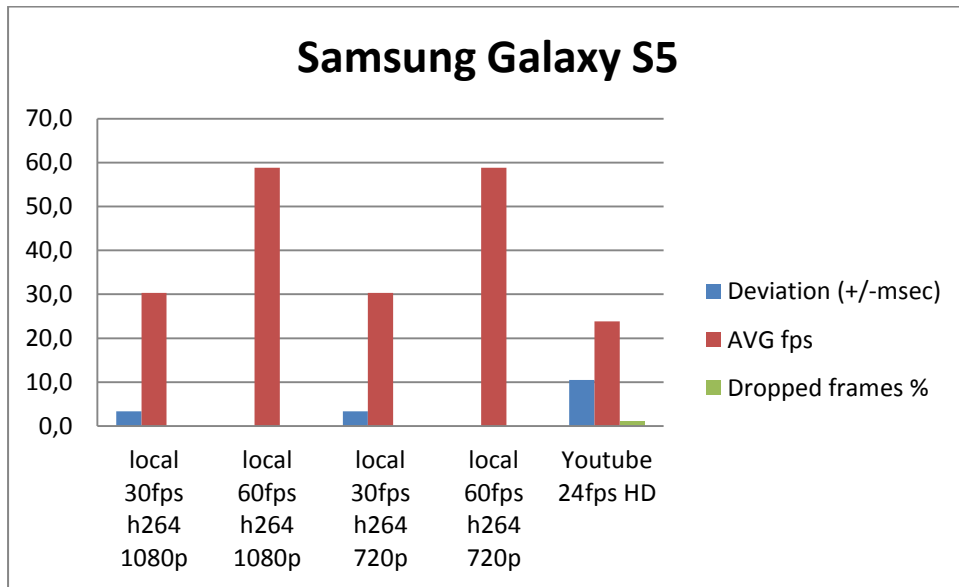


Image 10: Samsung S5 Video playback performance

Among this group of smart phones, the LG G3 is average. The playing of local videos was good, but there were still problems with deviation. Compared to the Samsung models, the LG performed better with the streamed YouTube video, and there were no noticeable dropped frames.

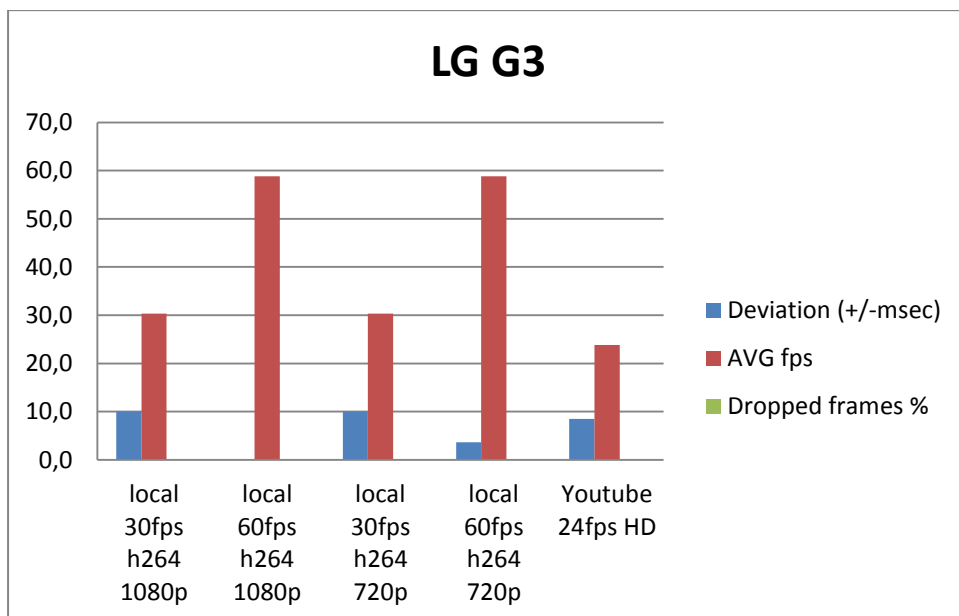
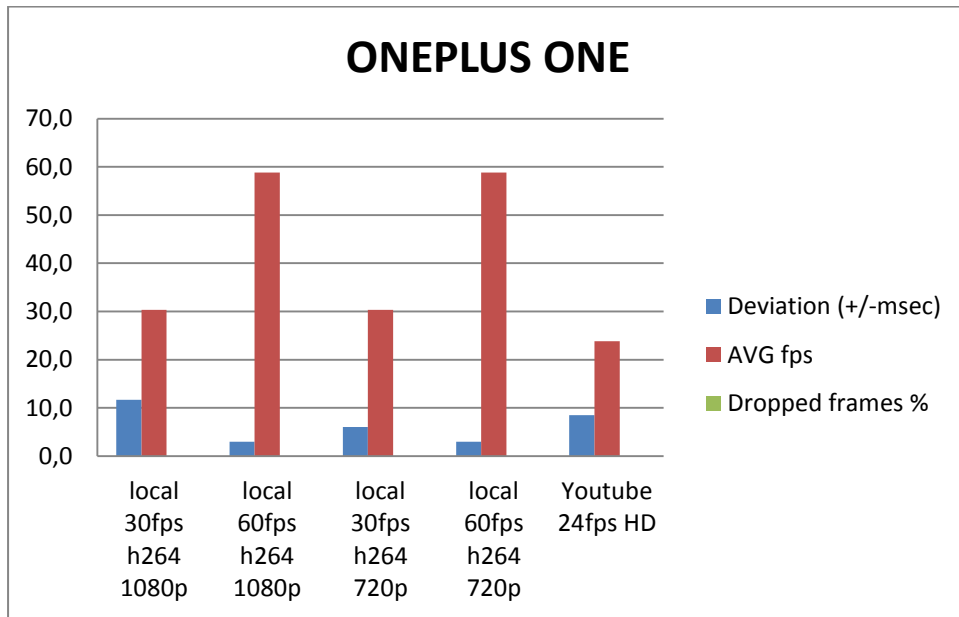


Image 9: LG G3 Video playback performance

As a newcomer in this smartphone league, the OnePlus One did OK. The Average fps was good, despite some level of deviation in all video categories.



2. Overall Conclusion

Despite some deviation with streamed YouTube videos, iPhones are sleek and strong operators overall. The only noticeable difference between the iPhone models was when playing the local 60fps video. All the other phones had surprisingly equal results and problems with deviation. The only model that struggled with a visible dropped frames issue was the Samsung S4. Since the Samsung S4 is a relatively old model, there should be more significant improvements in results for newer models like the LG G3, at least when comparing the price and the results between some of the older and newer models.

Whilst all the smartphones performed relatively well with the local video playback, there is still plenty of room for improvement with streamed video playback, which is the fastest increasing way of video watching. Pausing and jerking as a mode of deviation are irritating issues for the end-user, and in the future they may be one of the most important factors when comparing and making purchase decisions. This should also drive the development of video playback quality in cellphones.

More information:

[OptoFidelity Video Multimeter on YouTube](#)

<http://www.optofidelity.com/products-and-services/test-automation/video-playback-performance/video-multimeter/>

OptoFidelity on Twitter: <https://twitter.com/OptoFidelity>

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